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(54) **SEMICONDUCTOR FOR LIGHT EMITTING DEVICE**

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See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

6,586,043 B1	7/2003	Sinha	
6,936,859 B1	8/2005	Uemura	
2003/0129310 A1	7/2003	Sinha	
2004/0222434 A1 *	11/2004	Uemura et al.	257/99
2006/0081869 A1	4/2006	Lu et al.	
2009/0184329 A1	7/2009	Miki et al.	
2009/0250716 A1	10/2009	Haberern et al.	
2011/0018022 A1	1/2011	Okabe et al.	

FOREIGN PATENT DOCUMENTS

CN	1993837	7/2007
JP	2008-041866	2/2008
JP	2004-349301	12/2009
KR	10-0675208	1/2007
KR	10-2007-0041506	4/2007
KR	2009-0015633	2/2009

OTHER PUBLICATIONS

Derwent "Light source packaging structure" Derwent abstracts 2008.*
International Search Report dated Feb. 17, 2010.
Antonets, I.V., et al., "Conducting and Reflecting Properties of Thin Metal Films," Technical Physics, (Nov. 1, 2004), 49:11:1496-1500.
European Search Report dated Jul. 6, 2011.
European Search Report dated Feb. 20, 2012.
European Office Action dated Nov. 9, 2012.
Chinese Office Action dated Nov. 14, 2012.

* cited by examiner

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(57) **ABSTRACT**

Disclosed is a semiconductor light emitting device. The light emitting device includes a first conductive type semiconductor layer; an active layer on the first conductive type semiconductor layer; and a first electrode pad including a plurality of reflective layers on the first conductive type semiconductor layer.

30 Claims, 2 Drawing Sheets

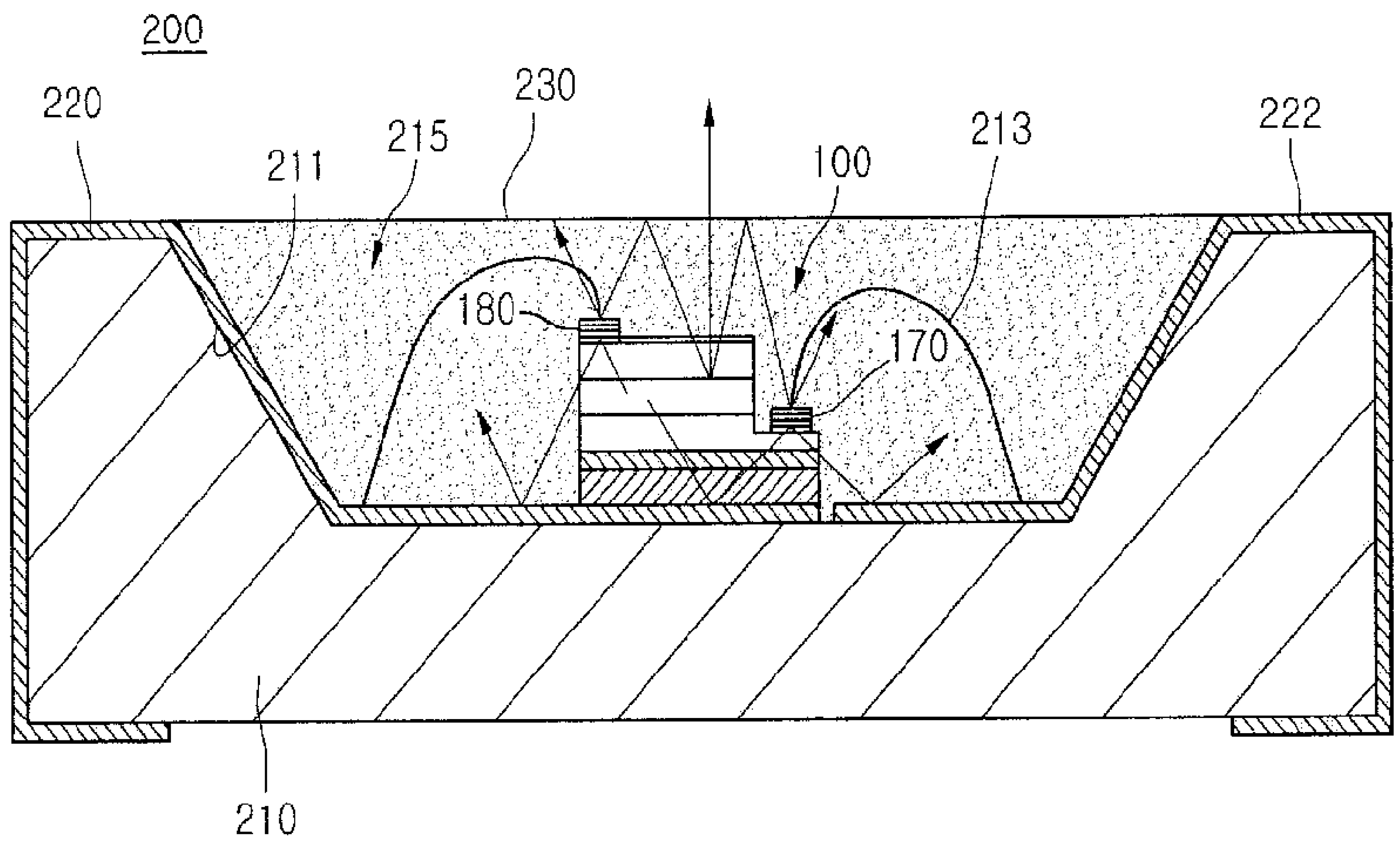


Figure 1

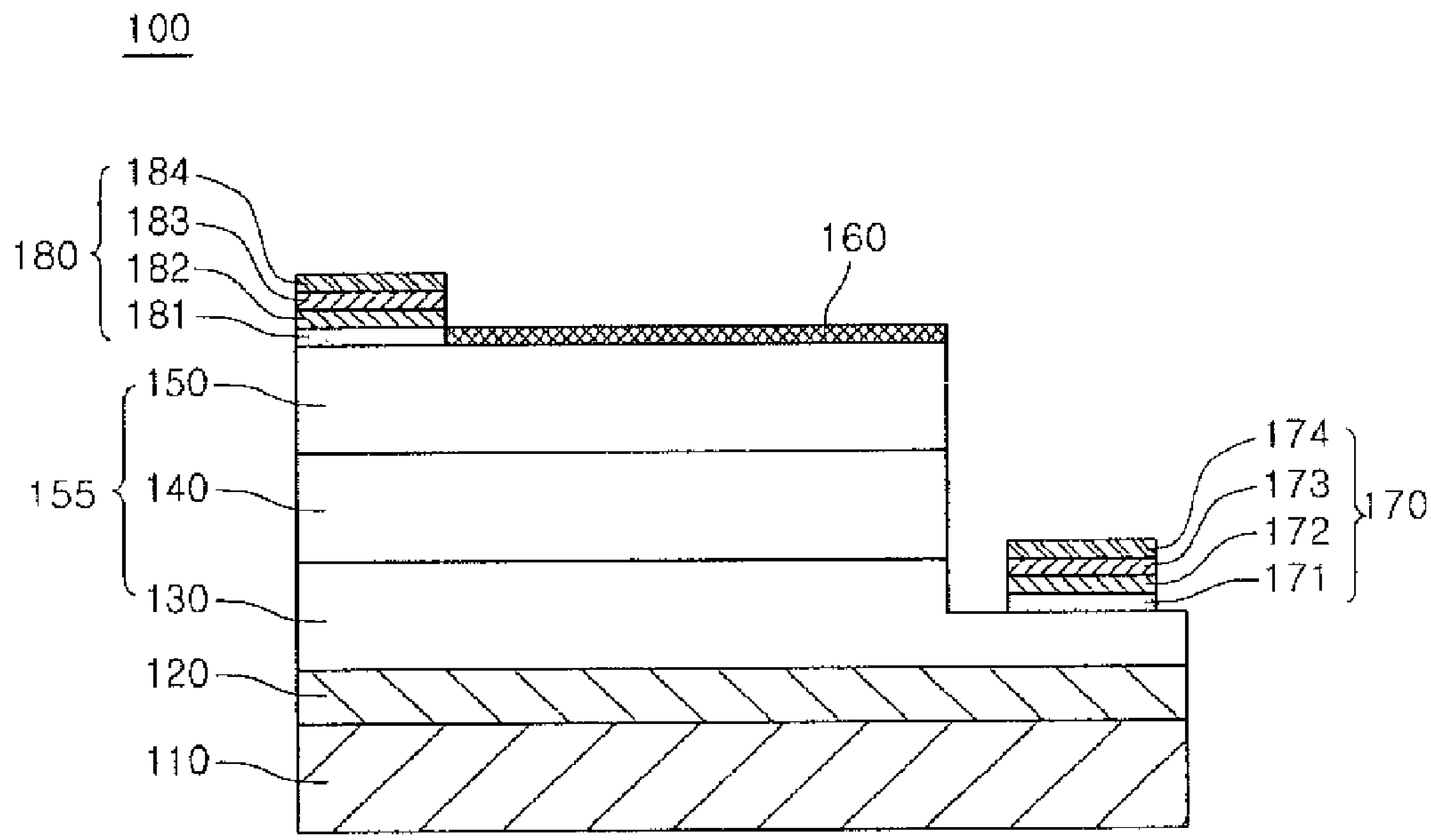


Figure 2

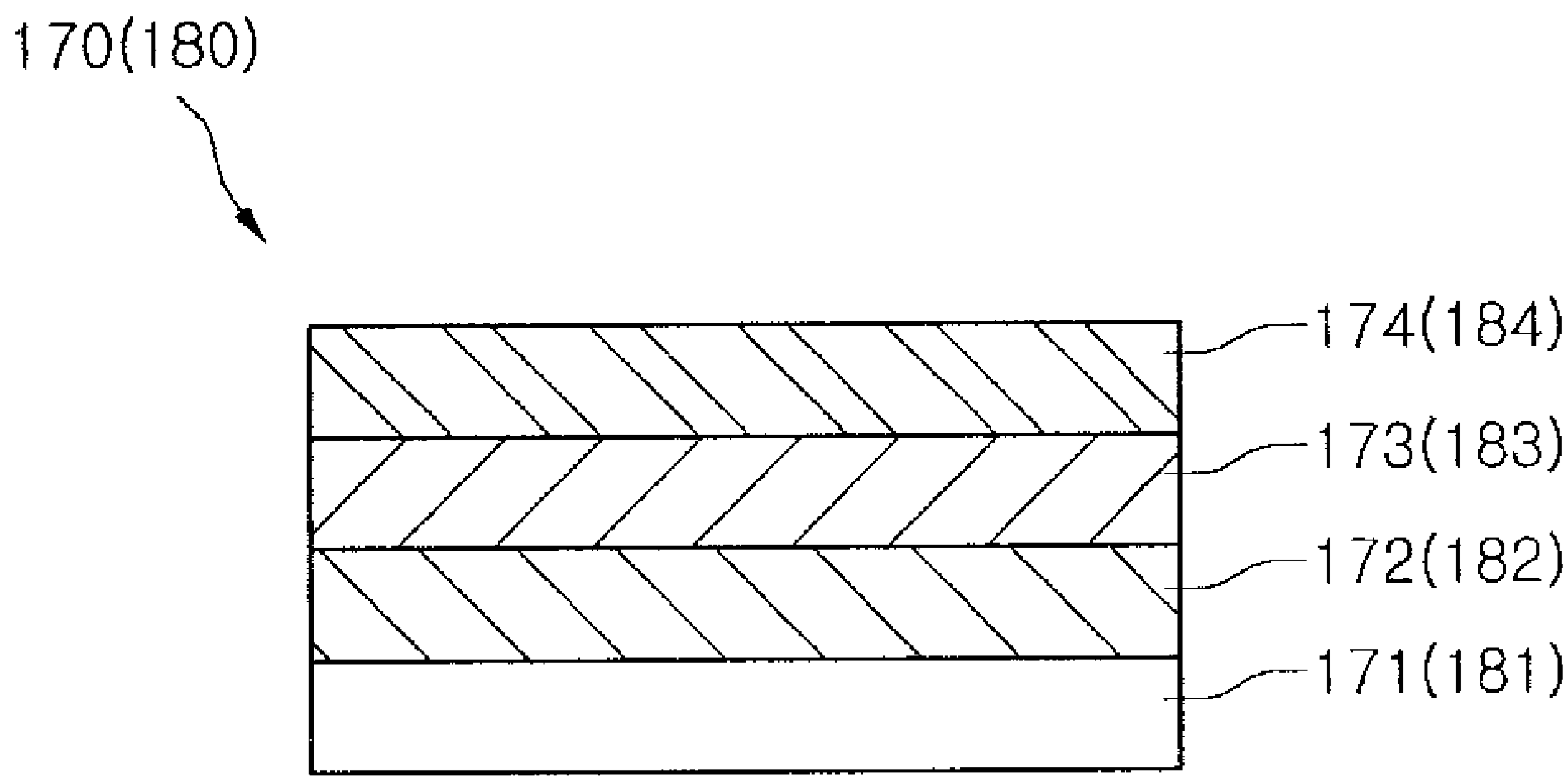
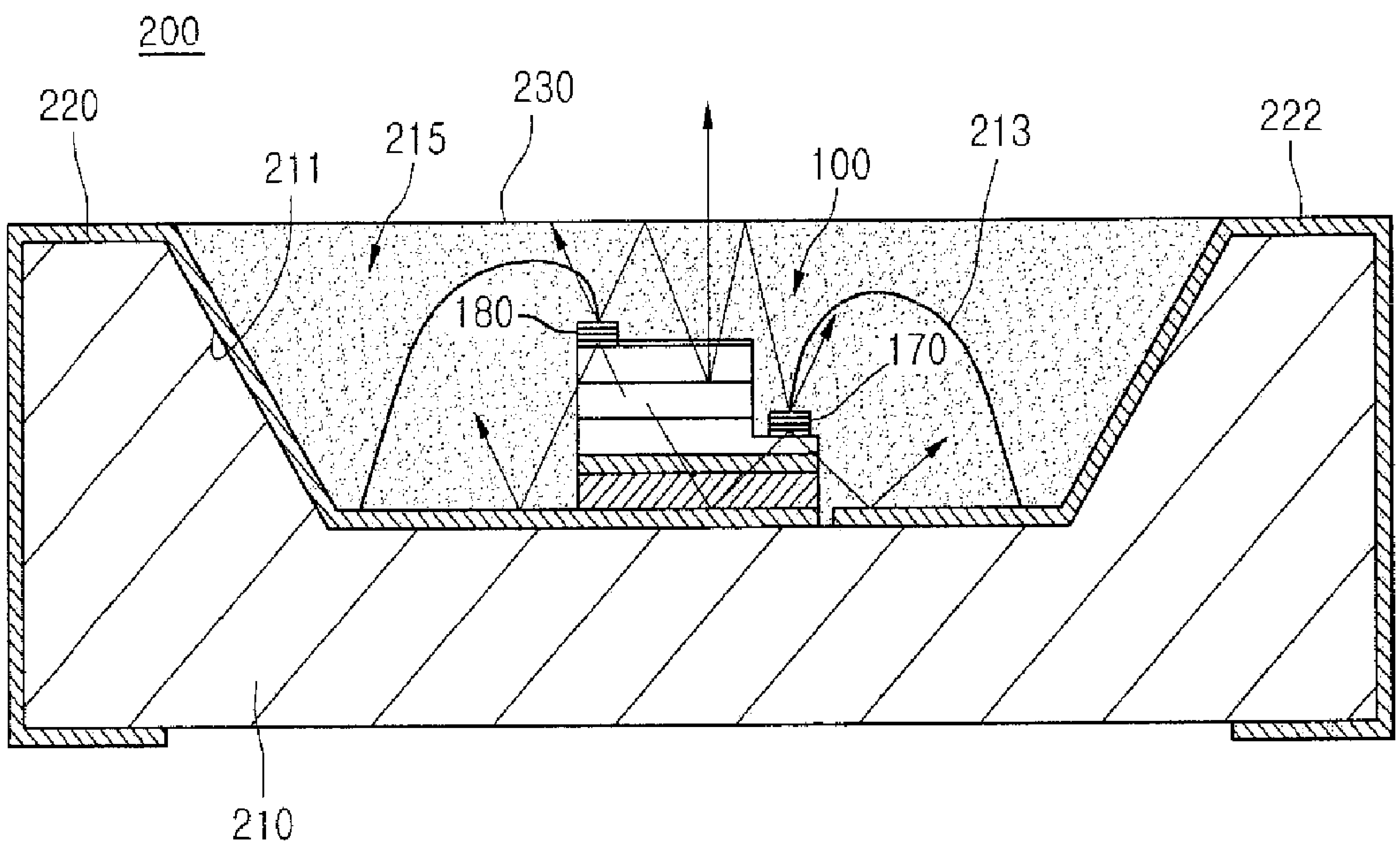


Figure 3



SEMICONDUCTOR FOR LIGHT EMITTING DEVICE

TECHNICAL FIELD

The embodiment relates to a semiconductor light emitting device.

BACKGROUND ART

Groups III-V nitride semiconductors have been extensively used as main materials for light emitting devices, such as a light emitting diode (LED) or a laser diode (LD), due to the physical and chemical characteristics thereof In general, the groups III-V nitride semiconductors include a semiconductor material having a composition formula of $In_xAl_yGa_{1-x-y}N$ ($0\leqq x\leqq 1$, $0\leqq y\leqq 1$, and $0\leqq x+y\leqq 1$).

The LED is a semiconductor device, which transmits/receives signals by converting an electric signal into infrared ray or light using the characteristics of compound semiconductors. The LED is also used as a light source.

The LED or LD using the nitride semiconductor material is mainly used for the light emitting device to provide the light. For instance, the LED or the LD is used as a light source for various products, such as a keypad light emitting part of a cellular phone, an electric signboard, and a lighting device.

DISCLOSURE

Technical Problem

The embodiment provides a semiconductor light emitting device including a plurality of reflective layers formed on a first electrode pad and/or a second electrode pad.

The embodiment provides a semiconductor light emitting device including an electrode pad having an adhesive layer, a first reflective layer, a barrier metal layer and a second reflective layer sequentially stacked on a semiconductor layer.

Technical Solution

An embodiment provides a semiconductor light emitting device, comprising a first conductive type semiconductor layer; an active layer on the first conductive type semiconductor layer; and a first electrode pad including a plurality of reflective layers on or under the first conductive type semiconductor layer.

An embodiment provides a semiconductor light emitting device, comprising a light emitting structure including a first conductive type semiconductor layer and a second conductive type semiconductor layer; a first electrode pad including a plurality of reflective layers on one side of the first conductive type semiconductor layer; a second electrode pad including a plurality of reflective layers on one side of the second conductive type semiconductor layer; and a second electrode layer on an another side of the second conductive type semiconductor layer.

Advantageous Effects

The embodiment can improve the external quantum efficiency.

The embodiment can improve the quantity of reflective light in a semiconductor light emitting device.

The embodiment can improve the light efficiency of a light emitting diode package.

DESCRIPTION OF DRAWINGS

FIG. **1** is a side sectional view showing a semiconductor light emitting device according to the first embodiment;

FIG. **2** is a sectional view showing the detailed structure of first and second electrode pads of FIG. **1**; and

FIG. **3** is a side sectional view showing a light emitting device package using the semiconductor light emitting device of FIG. **1**.

BEST MODE

[Mode for Invention]

Hereinafter, a semiconductor light emitting device according to the embodiment will be described in detail with reference to accompanying drawings. In the description of the embodiments, it will be understood that, when a layer is referred to as being "on" or "under" another layer, it can be "directly" or "indirectly" on another layer or one or more intervening layers may also be present. Such a position of the layer has been described with reference to the drawings. In the description about the embodiment, the thickness of elements shown in the accompanying drawings are for an illustrative purpose only, and the embodiment is not limited thereto.

FIG. **1** is a side sectional view showing a semiconductor light emitting device according to the first embodiment, and FIG. **2** is a sectional view showing the detailed structure of first and second electrode pads of FIG. **1**.

Referring to FIG. **1**, the semiconductor light emitting device **100** includes a substrate **110**, a buffer layer **120**, a first conductive type semiconductor layer **130**, an active layer **140**, a second conductive type semiconductor layer **150**, a second electrode layer **160**, a first electrode pad **170**, and a second electrode pad **180**.

The substrate **110** may include one selected from the group consisting of Al_20_3, GaN, SiC, ZnO, Si, GaP, InP, GaAs and conductive substrates. A concave-convex pattern can be formed on the substrate **110**, but the embodiment is not limited thereto.

A nitride semiconductor can be grown on the substrate **110**. In this case, growth equipment may be selected from the group consisting of E-beam evaporator, PVD (physical vapor deposition), CVD (chemical vapor deposition), PLD (plasma laser deposition), dual-type thermal evaporator, sputtering, and MOCVD (metal organic chemical vapor deposition), but the embodiment is not limited thereto.

The buffer layer **120** can be formed on the substrate **110**. The buffer layer **120** may include a material capable of reducing the mismatch of the lattice constant between the buffer layer **120** and the substrate **110**. For instance, the buffer layer **120** may include a single crystalline material or a group III-V compound semiconductor material, such as GaN, AlN, AlGaN, InGaN, Inn, InAlGaN, and AlInN. The buffer layer **120** can be omitted.

An undoped semiconductor layer (not shown) can be farmed on the buffer layer **120** or the substrate **110**. The undoped semiconductor layer may include an undoped GaN layer.

The first conductive type semiconductor layer **130** is formed on the buffer layer **120**. The first conductive type semiconductor layer **130** can be prepared as a single layer or a multiple layer by using a group III-V compound semiconductor material doped with a first conductive dopant, such as GaN, AlN, AlGaN, InGaN, Inn, InAlGaN, and AlInN.

If the first conductive type semiconductor layer **130** is an N type semiconductor layer, the first conductive dopant includes an N type dopant, such as Si, Ge, Sn, Se, or Te. The first conductive type semiconductor layer **130** may serve as an electrode contact layer, but the embodiment is not limited thereto.

The active layer **140** is formed on the first conductive type semiconductor layer **130**. The active layer **140** can be prepared as a single quantum well structure or a multiple quantum well structure.

The active layer **140** may have a stack structure including a well layer and a barrier layer, which are made from compound semiconductors of group III-V elements. For example, the active layer **140** may have a stack structure of an InGaN well layer/GaN barrier layer, or AlGaN well layer/GaN barrier layer. In addition, the active layer **140** may include a material having bandgap energy according to the wavelength of light emitted from the active layer **140**.

A conductive clad layer may be formed on and/or under the active layer **140**. The conductive clad layer may include an AlGaN-based semiconductor.

The second conductive type semiconductor layer **150** is formed on the active layer **140**. The second conductive type semiconductor layer **150** includes the compound semiconductors of group III-V elements doped with the second conductive dopant. For instance, the second conductive layer **150** can be prepared as a single layer or a multiple layer by using one selected from the group consisting of GaN, AlN, AlGaN, InGaN, InN, InAlGaN, and AlInN If the second conductive type semiconductor layer **150** is a P type semiconductor layer, the second conductive dopant includes the P type dopant such as Mg or Ze. The second conductive type semiconductor layer **150** may serve as an electrode contact layer, but the embodiment is not limited thereto.

The first conductive type semiconductor layer **130**, the active layer **140** and the second conductive type semiconductor layer **150** may constitute a light emitting structure **155**. In addition, the first conductive type semiconductor layer **130** may include a P type semiconductor layer and the second conductive type semiconductor layer **150** may include an N type semiconductor layer. Further, a third conductive type semiconductor layer, such as an N type semiconductor layer or a P type semiconductor layer, can be formed on the second conductive type semiconductor layer **150**. Accordingly, the light emitting structure **155** may include at least one of an N-P junction structure, a P-N junction structure, an N-P-N junction structure, and a P-N-P junction structure.

The second electrode layer **160** is formed on the second conductive type semiconductor layer **150**. The second electrode layer **160** may include a transparent electrode layer or a reflective electrode layer. The transparent electrode layer may include one selected from the group consisting of ITO (indium tin oxide), IZO (indium zinc oxide), IZTO (indium zinc tin oxide), IAZO (indium aluminum zinc oxide), IGZO (indium gallium zinc oxide), IGTO (indium gallium tin oxide), AZO (aluminum zinc oxide), ATO (antimony tin oxide), RuOx, TiOx, and IrOx. In addition, the reflective electrode layer may include one selected from the group consisting of Al, Ag, Pd, Rh, Pt, and Ir.

The second electrode layer **160** can uniformly diffuse input current or the second electrode layer **160** can reflect or refract the emitted light.

The first electrode pad **170** is formed at one side of the first conductive type semiconductor layer **130** and the second electrode pad **180** is formed at one side of the second conductive type semiconductor layer **150**. If the third conductive type semiconductor layer (not shown) is formed on the second conductive type semiconductor layer **150**, the second electrode pad **180** is formed on the third conductive type semiconductor layer.

One side of the first conductive type semiconductor layer **130** may be exposed through a mesa etching process. The mesa etching process can be performed after the second conductive type semiconductor layer **150** or the second electrode layer **160** has been formed.

The second electrode pad **180** can directly make contact with the second electrode layer **160** and/or the second conductive type semiconductor layer **150**. The second electrode pad **180** is formed on one side of a top surface of the second conductive type semiconductor layer **150**, and the second electrode layer **160** makes contact with an outer peripheral portion of the second electrode pad **180**. In addition, the second electrode pad **180** can be formed on the second electrode layer **160** while indirectly making contact with the second conductive type semiconductor layer **150**. Further, the second electrode pad **180** can directly make contact with the second conductive type semiconductor layer **150** through an opening (not shown) of the second electrode layer **160**.

The first electrode pad **170** includes a plurality of reflective layers **172** and **174**, and the second electrode pad **180** includes a plurality of reflective layers **182** and **184**. The first and second electrode pads **170** and **180** may have the same structure and one of the first and second electrode pads **170** and **180** can be prepared as a normal pad without the reflective layers. According to the embodiment, the number of the first and second electrode pads **170** and **180** may vary depending on the size of the device, and the embodiment is not limited thereto.

Referring to FIGS. **1** and **2**, the first electrode pad **170** includes a first adhesive layer **171**, a first reflective layer **172**, a first barrier metal layer **173**, and a second reflective layer **174**.

The first adhesive layer **171** is foiled on the first conductive type semiconductor layer **130**. The first adhesive layer **171** may include a material having superior adhesive property with respect to the first conductive type semiconductor layer **130**. For instance, the first adhesive layer **171** includes at least one selected from the group consisting of Cr, V, W, Ti, an APC (Ag+Pd+Cu) alloy, a Cr-first metal alloy, and a Ti-second metal alloy. The first metal includes at least one of Fe, Tu, Mo, Al and Ag, and the second metal includes at least one of Fe, Tu, Mo, Al and Ag.

If the first adhesive layer **171** has a thick thickness, the light is absorbed in the first adhesive layer **171**. Thus, the first adhesive layer **171** may have a thickness sufficient for transmitting the light. For instance, the first adhesive layer **171** has a thickness of about 1 to 60,000 Å.

The first reflective layer **172** is formed on the first adhesive layer **171** and includes a material having superior reflectance. For instance, the first reflective layer **172** may include at least one selected from the group consisting of Al, Ag, an APC (Ag+Pd+Cu) alloy, an Al-third metal alloy, and an Ag-fourth metal alloy. The third metal includes at least one of Cr, Fe, Mo and Tu. In addition, the fourth metal includes at least one of Cr, Fe, Mo and Tu. The first reflective layer **172** may have a thickness of about 1 to 50,000 Å.

The first barrier metal layer **173** is formed on the first reflective layer **172** and the second reflective layer **174** is formed on the first barrier metal layer **173**. The first barrier metal layer **173** is a boundary layer between the first and second reflective layers **172** and **174** and allows the first and second reflective layers **172** and **174** to effectively reflect the light. In addition, the first barrier metal layer **173** prevents the first and second reflective layers **172** and **174** from reacting with each other. The first barrier metal layer **173** can be formed by using various metals. For instance, the first barrier metal layer **173** can be prepared as a single layer or a multiple layer by using Ni or Ni—N.

The second reflective layer **174** may include at least one selected from the group consisting of Al, Ag, an APC (Ag+Pd+Cu) alloy, an Al-fifth metal alloy, and an Ag-sixth metal alloy. The fifth metal includes at least one of Cr, Fe, Mo and Tu. In addition, the sixth metal includes at least one of Cr, Fe, Mo and Tu. The second reflective layer **174** may have a thickness of about 1 to 50,000 Å.

The second reflective layer **174** may include a material identical to or different from that of the first reflective layer **172**.

The second electrode pad **180** includes a second adhesive layer **181**, a third reflective layer **182**, a second barrier metal layer **183** and a fourth reflective layer **184**. The second electrode pad **180** has the structure the same as that of the first electrode pad **170**, so the structure of the second electrode pad **180** will be briefly described with reference to the layers **171** to **174** of the first electrode pad **170**.

The second adhesive layer **181** is foamed on the second conductive type semiconductor layer **150** or the second electrode layer **160**. The second adhesive layer **181** directly makes contact with the second conductive type semiconductor layer **150** and/or the second electrode layer **160**.

The second adhesive layer **181** may include a material having superior adhesive property with respect to the second conductive type semiconductor layer **150**. For instance, the second adhesive layer **181** includes at least one selected from the group consisting of Cr, V, W, Ti, an APC (Ag+Pd+Cu) alloy, a Cr-first metal alloy, and a Ti-second metal alloy. The first metal includes at least one of Fe, Tu, Mo, Al and Ag, and the second metal includes at least one of Fe, Tu, Mo, Al and Ag. The second adhesive layer **181** and the first adhesive layer **171** can be simultaneously formed by using the same material.

If the second adhesive layer **181** has a thick thickness, the light is absorbed in the second adhesive layer **181**. Thus, the second adhesive layer **181** may have a thickness sufficient for transmitting the light. For instance, the second adhesive layer **181** has a thickness of about 1 to 60,000 Å.

The third reflective layer **182** is formed on the second adhesive layer **181**. The third reflective layer **182** and the first reflective layer **172** can be simultaneously formed by using the same material.

The third reflective layer **182** includes a material having superior reflectance. For instance, the third reflective layer **182** may include at least one selected from the group consisting of Al, Ag, an APC (Ag+Pd+Cu) alloy, an Al-third metal alloy, and an Ag-fourth metal alloy. The third metal includes at least one of Cr, Fe, Mo and Tu. In addition, the fourth metal includes at least one of Cr, Fe, Mo and Tu. The third reflective layer **182** may have a thickness of about 1 to 50,000 Å.

The second barrier metal layer **183** is formed on the third reflective layer **182** and the fourth reflective layer **184** is formed on the second barrier metal layer **183**.

The second barrier metal layer **183** prevents the third and fourth reflective layers **182** and **184** from reacting with each other. For instance, the second barrier metal layer **183** can be prepared as a single layer or a multiple layer by using Ni or Ni—N. The second barrier metal layer **183** and the first barrier metal layer **173** can be simultaneously formed by using the same material.

The fourth reflective layer **184** may include at least one selected from the group consisting of Al, Ag, an APC (Ag+Pd+Cu) alloy, an Al-fifth metal alloy, and an Ag-sixth metal alloy. The fifth metal includes at least one of Cr, Fe, Mo and Tu. In addition, the sixth metal includes at least one of Cr, Fe, Mo and Tu. The fourth reflective layer **184** may have a thickness of about 1 to 50,000 Å. The fourth reflective layer **184** and the second reflective layer **174** can be simultaneously formed by using the same material.

The fourth reflective layer **184** may include the material identical to or different from that of the third reflective layer **183**.

The first and second electrode pads **170** and **180** can be formed as follows. A photoresist layer is coated on the top surface of the semiconductor layer and a pad region is exposed through a lithography process. Then, the layers **171** to **174** of the first electrode pad **170** and the layers **181** to **184** of the second electrode pad **180** are sequentially formed. The layers **171** to **174** of the first electrode pad **170** and the layers **181** to **184** of the second electrode pad **180** are deposited in the vacuum evaporator through the E-beam evaporation scheme. After that, layers, which are unnecessarily formed on the photoresist layer, are removed. Such a method for forming the first and second electrode pads **170** and **180** can be changed, and the embodiment is not limited thereto.

In the semiconductor light emitting device **100**, if current is applied to the first and second electrode pads **170** and **180**, light generated from the active layer **140** is omni-directionally emitted. Some light is travelled toward the first or second electrode pad **170** or **180**, and then reflected from the first and third reflective layers **172** and **182**. In addition, light travelled from the outside to the inside of the device is reflected from the second or fourth reflective layer **174** or **184**. Thus, the light efficiency can be improved.

The semiconductor light emitting device **100** is a lateral type semiconductor light emitting device. According to another embodiment, a vertical type semiconductor light emitting device can be used for the semiconductor light emitting device **100**.

The vertical type semiconductor light emitting device may include a reflective electrode layer serving as the second electrode pad and a conductive support member formed on the second conductive type semiconductor layer and the growth substrate under the first conductive type semiconductor is removed. The reflective electrode layer is the second electrode pad where the adhesive layer, the third reflective layer, the second barrier metal layer and the fourth reflective layer are sequentially foamed, but the embodiment is not limited thereto.

After the growth substrate under the first conductive type semiconductor layer has been removed, the conductive support member is placed on the base and the wet etching and/or the dry etching process is performed to expose the first conductive type semiconductor layer. As the first conductive type semiconductor layer is exposed, the first electrode pad is formed on the first conductive type semiconductor layer. The first electrode pad includes the first adhesive layer, the first reflective layer, the first barrier metal layer and the second metal layer. The stack structure and material for the first electrode pad is similar to those of the first embodiment. The electrode pad can be properly selected within the scope of the present invention.

FIG. **3** is a side sectional view showing a light emitting device package using the semiconductor light emitting device of FIG. **1**.

Referring to FIG. **3**, the light emitting device package **200** includes a package body **210** having a cavity **215**, a plurality of electrode leads **220** and **222**, a semiconductor light emitting device **100**, a wire **213** and a resin material **230**.

The package body **210** may include one selected from the group consisting of PPA (polyphthalamide), liquid crystal polymer, resin material (for example, SPS (syndiotactic polystyrene)), an MCPCB (metal core PCB), a PCB, a ceramic PCB, FR-4, AlN (aluminum nitride), and SiC (silicon carbide). In addition, the package body **210** can be prepared in the form of a COB (chip on board) or a multiple substrate structure. The embodiment may not limit the material, the structure and the shape of the package body **210**.

The cavity **215** is formed at an upper portion of the cavity body **210**. The cavity **215** may be omitted.

A periphery wall **211** of the cavity **215** is inclined or perpendicular to the bottom of the cavity **215**. The first and second electrode leads **222** and **220** are disposed in the cavity **215**. The first and second electrode leads **222** and **220** may include metals having superior reflective property.

Other ends of the first and second electrode leads **222** and **220** are exposed out of the cavity body **210** to serve as external electrodes.

The semiconductor light emitting device **100** is die-bonded onto the first electrode lead **222** by an adhesive (not show) and electrically connected to the first and second electrode pads **170** and **180** through the wire **213**.

Th cavity **215** is filled with the resin material **230**, such as epoxy or silicon resin. Phosphor may be added to the resin material **230**. The top surface of the resin material **230** has a flat shape, a convex lens shape or a concave shape. A lens (not shown) can be formed on the resin material **230** through injection molding or attached onto the resin material **230**.

Referring to FIGS. **1** and **3**, in the light emitting device package **200**, if current is applied to the first and second electrode leads **222** and **220**, light generated from the semiconductor light emitting device **100** is omni-directionally emitted. The light is reflected from the first and second reflective layers **172** and **174** of the first electrode pad **170** and the third and fourth reflective layers **182** and **184** of the second electrode pad **180**, respectively. Thus, the light efficiency of the light emitting device package **200** can be improved and the reliability of the light emitting device package **200** can be can be enhanced.

The second electrode layer (**160** of FIG. **1**) of the semiconductor light emitting device **100** may be a transparent electrode.

Meanwhile, when the semiconductor light emitting device **100** is mounted on the electrode leads **220** and **222** through the flip scheme, the second electrode layer (**160** of FIG. **1**) may serve as the reflective electrode layer to reflect the incident light.

At least one lateral type or vertical type light emitting device can be installed in the light emitting device package **200** in the form of a chip, but the embodiment is not limited thereto. In addition, the light emitting device package **200** may have various shapes within the scope of the embodiment.

The light emitting device package according to the embodiment can be used as a light source in various products, such as a lighting indicator, a character indicator, a lighting device and an image indicator.

In the description of the embodiments, it will be understood that, when a layer (or film), a region, a pattern, or a structure is referred to as being "on" or "under" another substrate, another layer (or film), another region, another pad, or another pattern, it can be "directly" or "indirectly" on the other substrate, layer (or film), region, pad, or pattern, or one or more intervening layers may also be present.

Although embodiments have been described with reference to a number of illustrative embodiments thereof, it should be understood that numerous other modifications and embodiments can be devised by those skilled in the art that will fall within the spirit and scope of the principles of this disclosure. More particularly, various variations and modifications are possible in the component parts and/or arrangements of the subject combination arrangement within the scope of the disclosure, the drawings and the appended claims In addition to variations and modifications in the component parts and/or arrangements, alternative uses will also be apparent to those skilled in the art.

[Industrial Applicability]

The embodiments provide the light emitting diode capable of improving the light efficiency.

The embodiments provide the light emitting diode used as a light source in various products, such as a lighting indicator, a character indicator, a lighting device and an image indicator.

The invention claimd is:

1. A light emitting device comprising:

a first semiconductor layer;

a second semiconductor layer;

an active layer between the first and second semiconductor layers;

an electrode layer over a portion of the second semiconductor layer;

a first electrode pad electrically coupled to the first semiconductor layer; and

a second electrode pad electrically coupled to the second semiconductor layer,

wherein the first and second semiconductor layers are of different conductivity types, the second electrode pad includes an adhesive layer over the second semiconductor layer, and the adhesive layer and the electrode layer are located substantially in a same plane, wherein the active layer emits light and wherein a first portion of the light passes through the electrode layer and a second portion of the light is reflected by the second electrode pad.

2. The light emitting device of claim **1**, wherein the adhesive layer is in direct contact with the second semiconductor layer.

3. The light emitting device of claim **1**, wherein at least a portion of the first semiconductor layer is greater in width than the second semiconductor layer, and wherein the first electrode pad is over the first semiconductor layer.

4. The light emitting device of claim **3**, wherein a first portion of the first semiconductor layer has a first width and a second portion of the first semiconductor layer has a second width, and wherein the first width is greater than a width of the second semiconductor layer and the second width is less than the first width.

5. The light emitting device of claim **4**, wherein a surface of the first portion is above a surface of the second portion.

6. The light emitting device of claim **1**, wherein at least one of the first electrode pad or the second electrode pad includes a plurality of light adjusting layers.

7. The light emitting device of claim **6**, wherein the plurality of light adjusting layers are light reflective layers.

8. The light emitting device of claim **6**, further comprising: a barrier layer between two of the light adjusting layers.

9. The light emitting device of claim **1**, wherein the second electrode pad includes a plurality of light adjusting layers.

10. The light emitting device of claim **9**, wherein the light adjusting layers are light reflecting layers.

11. The light emitting device of claim **9**, wherein the electrode layer performs substantially a same light adjusting function as the light adjusting layers of the second electrode pad.

12. The light emitting device of claim **1**, wherein the electrode layer is a substantially transparent layer.

13. The light emitting device of claim **1**, wherein the first electrode pad includes a plurality of light adjusting layers, a metal layer between two of the light adjusting layers, and an adhesive layer, and wherein the adhesive layer is made of at least one material selected from the group consisting of Cr, V, W, Ti, an APC (Ag+Pd+Cu) alloy, a Cr-first metal alloy, and a Ti-second metal alloy.

14. The light emitting device of claim **13**, wherein the metal layer includes at least one of Fe, Tu, Mo, Al or Ag.

15. The light emitting device of claim **13**, wherein each of the light adjusting layers include at least one selected from the group consisting of Al, Ag, an APC (Ag+Pd+Cu) alloy, an Al-third metal alloy, and an Ag-fourth metal alloy, and wherein the metal layer includes at least one of Cr, Fe, Mo or Tu.

16. The light emitting device of claim **13**, wherein the second electrode pad includes at least one selected from the group consisting of ITO (indium tin oxide), IZO (indium zinc oxide), IZTO (indium zinc tin oxide), IAZO (indium aluminum zinc oxide), IGZO (indium gallium zinc oxide), IGTO (indium gallium tin oxide), AZO (aluminum zinc oxide), ATO (antimony tin oxide), RuOx, TiOx, IrOx, Al, Ag, Pd, Rh, Pt, and Ir.

17. The light emitting device of claim **13**, wherein:

the second electrode pad includes a plurality of light adjusting layers, a metal layer between two of the light adjusting layers, and an adhesive layer to adhere the second electrode pad to second semiconductor layer, and

the adhesive layer includes at least one of Cr, V, W, Ti, an APC (Ag+Pd+Cu) alloy, a Cr alloy or a Ti alloy, the metal layer includes Ni or Ni-N, and

the light adjusting layers include at least one of Al, Ag, an APC (Ag+Pd+Cu) alloy, an Al alloy or an Ag alloy.

18. The light emitting device of claim **1**, wherein the first electrode pad includes an adhesive layer, a first reflecting layer, a barrier layer, and a second reflecting layer in order.

19. A light emitting device package comprising:

a package body;

the light emitting device of claim **1** electrically coupled to the package body;

a first lead coupled to the first electrode pad; and

a second lead coupled to the second electrode pad.

20. The package of claim **19**, wherein the first and second leads are formed over the package body.

21. The package of claim **19**, wherein the light emitting device is coupled to a cavity in the package body.

22. The package of claim **19**, wherein the first and second leads reflect light emitted from the light emitting device.

23. The light emitting device of claim **1**, wherein the adhesive layer of the second electrode pad is at least partially located between a top surface of the second electrode pad and the second semiconductor layer.

24. The light emitting device of claim **23**, wherein the adhesive layer of the second electrode pad and the electrode layer do not substantially overlap.

25. The light emitting device of claim **23**, wherein the adhesive layer of the second electrode pad is adjacent only one side of the electrode layer.

26. The light emitting device of claim **1**, wherein the adhesive layer of the second electrode pad does not overlap the first electrode pad.

27. The light emitting device of claim **1**, wherein the second electrode pad has a substantially constant width and wherein a width of the adhesive layer of the second electrode pad is substantially equal to the substantially constant width of the second electrode pad.

28. The light emitting device of claim **1**, wherein each of the first electrode pad and the second electrode pad include a plurality of layers.

29. The light emitting device of claim **28**, wherein the first electrode pad has a same number of layers as the second electrode pad.

30. The light emitting device of claim **29**, wherein each of the first electrode pad and the second electrode pad have at least two reflective layers.

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